

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To:

see form PCT/ISA/220

PCT

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/GB2004/003016

International filing date (day/month/year)
09.07.2004

Priority date (day/month/year)
12.07.2003

International Patent Classification (IPC) or both national classification and IPC
H01L21/20, H01L51/40

Applicant
HEWLETT-PACKARD DEVELOPMENT COMPANY, L.P.

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☒ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☒ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

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**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**International application No.
PCT/GB2004/003016**IAP20 Rec'd PCT/PTO 06 JAN 2006****Box No. I Basis of the opinion**

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
☐ a sequence listing
☐ table(s) related to the sequence listing
 - b. format of material:
☐ in written format
☐ in computer readable form
 - c. time of filing/furnishing:
☐ contained in the international application as filed.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/GB2004/003016

Box No. II Priority

1. ☒ The following document has not been furnished:
- ☒ copy of the earlier application whose priority has been claimed (Rule 43bis.1 and 66.7(a)).
 - ☐ translation of the earlier application whose priority has been claimed (Rule 43bis.1 and 66.7(b)).
- Consequently it has not been possible to consider the validity of the priority claim. This opinion has nevertheless been established on the assumption that the relevant date is the claimed priority date.
2. ☐ This opinion has been established as if no priority had been claimed due to the fact that the priority claim has been found invalid (Rules 43bis.1 and 64.1). Thus for the purposes of this opinion, the international filing date indicated above is considered to be the relevant date.
3. ☐ It has not been possible to consider the validity of the priority claim because a copy of the priority document was not available to the ISA at the time that the search was conducted (Rule 17.1). This opinion has nevertheless been established on the assumption that the relevant date is the claimed priority date.
4. Additional observations, if necessary:

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-26
	No: Claims	
Inventive step (IS)	Yes: Claims	13-21
	No: Claims	1-12,22-26
Industrial applicability (IA)	Yes: Claims	1-26
	No: Claims	

2. Citations and explanations

see separate sheet

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING
AUTHORITY (SEPARATE SHEET)**

IAP20 Res. d. PCT/PTO 06 JAN 2006
International Application No.
PCT/GB2004/003016

Re Item V.

1.0 The following document is referred to in this communication:

- D1: US 2002/0008464, 24 January 2002
- D2: US 2002/0172887, 21 November 2002
- D3: WO 01/95384, 13 December 2001
- D4: US 2002/0093017, 18 July 2002
- D5: JP63299297, 6 December 1988
- D6: US 2002/0146893, 10 October 2002

2.0 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claims 1 - 12, 25 and 26 does not involve an inventive step in the sense of Article 33(3) PCT.

2.1 The document D1 discloses (the references in parentheses applying to this document):

a transistor device (fig. 1) having a metallic source electrode, a metallic drain electrode, a metallic gate electrode (paragraph [0034]) and a channel in a deposited semiconductor material ("13" in fig. 1), the transistor device comprising: a first layer comprising the metallic gate electrode, a first metal portion of the metallic source electrode and a first metal portion of the metallic drain electrode; a second layer comprising a second metal portion of the metallic source electrode ("105"), a second metal portion of the metallic drain electrode ("104") the deposited semiconductor material; and a third layer comprising a substrate ("10" in fig.1), wherein the first, second and third layers are arranged in order such that the second layer is positioned between the first layer and the third layer

from which the subject-matter of claim 1 differs in that there is a dielectric material between the semiconductor material and the metallic gate electrode. The inclusion of a gate dielectric is common practice for thin film transistors and therefore not inventive.

The subject-matter of claim 1 is not inventive.

2.2 Each of D2 (paragraphs [0091] - [0095]) and figures 5A-5D and 6A-6D) or D3 (p. 8, l. 6 - l. 15 and fig. 7) describes the transistor device of claim 1, however, the first layer is positioned between the second and the third layer. A device with poly-Si electrodes, in which the second layer lies between the first and the third layer is known from D4 (fig. 1(e)). Turning the transistor devices of D2 or D3 upside down is not inventive.

2.3 Dependent device claims 2 - 12 and device claims 25 and 26 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of inventive step.

3.0 D5 is considered the closest prior art for method claim 13 and describes a method for use in forming a transistor device comprising:

(i) forming a transfer layer ("6" and "7" first figure) on a conductive carrier ("2");

(ii) fixing the transfer layer to a substrate (5th figure);

(iii) removing the conductive carrier (6th figure), wherein the transfer layer is formed in step (i) by:

a) selectively masking the conductive carrier ("7" first figure) to expose first, second and third portions of the conductive carrier;

b) electro-depositing metal onto the first, second and third portions of the conductive carrier to form first, second and third metal portions ("6");

from which the subject-matter of claim 13 differs in that further

c) dielectric material is deposited over at least the second metal portion;

d) metal is electro-deposited on the first and third metal portions; and

e) semiconductor material is deposited over the dielectric layer.

It is known from D6 (paragraphs [0360] - [0364] figures 31 - 34) to transfer an entire transistor device, however the steps c) - e) are not described in D6.

The subject-matter of method claim 13 is new and inventive.

3.1 Method claims 14 - 21 being dependent on claim 13 also fulfill the requirements of PCT regarding novelty and inventive step.

Re Item VIII.

- 4.1 A device cannot be rendered new or inventive by the method of its manufacture, even if this method is new and inventive. A device must be described by features directly discernable in the final device which render the device as such new and inventive.

The feature of electrodeposited electrodes in claims 2, 25, and 26 therefore lacks clarity as does the feature of the deposited semiconductor material in claim 7 "comprising indications that it was deposited from liquid".

- 4.2 Although claims 1 and 25 have been drafted as separate independent claims, they appear to relate effectively to the same subject-matter and to differ from each other only with regard to the definition of the subject-matter for which protection is sought and in respect of the terminology used for the features of that subject-matter. The aforementioned claims therefore lack conciseness and as such do not meet the requirements of Article 6 PCT. As claim 25 comprises all the features of claim 1 it should be formulated to be dependent on claim 1.

- 4.3 The scope of protection is not clear from claims 22 - 24 as such, contrary to Rule 6.2(a) PCT.
Furthermore, the category of device claim 22 is not clear as it depends on method claims 13 - 21.